Claims

1. The use of a GALR2-specific agonist in the preparation of a medicament for the prevention or treatment of brain injury, damage or disease.

2. The use according to claim 1 wherein the brain injury or damage is caused by one of: embolic, thrombotic or haemorrhagic stroke; direct or indirect trauma or surgery to the brain or spinal cord; ischaemic or embolic damage to the brain during cardiopulmonary bypass surgery or renal dialysis; reperfusion brain damage following myocardial infarction; brain disease; immunological damage, chemical damage or radiation damage.

3. The use according to claim 2 wherein the immunological damage is the result of bacterial or viral infection.

4. The use according to claim 2 wherein the chemical damage is the result of excess alcohol consumption or administration of chemotherapy agents for cancer treatment.

5. The use according to claim 2 wherein the radiation damage is the result of radiotherapy.

6. The use according to claim 1 or 2 wherein the brain disease is one of Alzheimer's Disease, Parkinson's Disease, Multiple Sclerosis or variant Creutzfeld Jacob Disease.

7. The use according to any preceding claim wherein the GALR2-specific agonist is a polypeptide comprising a portion of the galanin amino acid sequence.

8. The use according to claim 7 wherein the GALR2-specific agonist is AR-M1896.

9. The use according to any of claims 1-6 wherein the GALR2-specific agonist is a non-peptide small chemical entity.

10. The use according to any preceding claim wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 30-fold binding specificity for GALR2 over GALR1.

11. The use according to any preceding claim wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 50-fold binding specificity for GALR2 over GALR1.

12. The use according to any preceding claim wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 100-fold binding specificity for GALR2 over GALR1.

13. The use according to any of claims 10-12 wherein the GALR2-specific agonist has a greater than 30-fold binding specificity for GALR2 over GALR3.

14. The use according to any of claims 10-12 wherein the GALR2-specific agonist has a greater than 50-fold binding specificity for GALR2 over GALR3.

15. The use according to any of claims 10-12 wherein the GALR2-specific agonist has a greater than 100-fold binding specificity for GALR2 over GALR3.

16. The use according to any of claims 10-15 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 1μM.

17. A method for preventing or treating brain injury, damage or disease comprising administering an effective amount of a GALR2-specific agonist to an individual in need of such prevention or treatment.

18. A method according to claim 17 wherein the brain injury or damage is caused by one of: embolic, thrombotic or haemorrhagic stroke; direct or indirect trauma or surgery to the brain or spinal cord; ischaemic or embolic damage to the brain during cardiopulmonary bypass surgery or renal dialysis; reperfusion brain damage following myocardial infarction; brain disease; immunological damage, chemical damage or radiation damage.

19. A method according to claim 18 wherein the immunological damage is the result of bacterial or viral infection.

20. A method according to claim 18 wherein the chemical damage is the result of excess alcohol consumption or administration of chemotherapy agents for cancer treatment.

21. A method according to claim 18 wherein the radiation damage is the result of radiotherapy.

22. A method according to claim 17 or 18 wherein the brain disease is one of Alzheimer's Disease, Parkinson's Disease, Multiple Sclerosis or variant Creutzfeld Jacob Disease.

23. A method according to any of claims 17-22 wherein the GALR2-specific agonist is a polypeptide comprising a portion of the galanin amino acid sequence.

24. A method according to claim 23 wherein the GALR2-specific agonist is AR-M1896.

25. A method according to any of claims 17-22 wherein the GALR2-specific agonist is a non-peptide small chemical entity.

26. A method according to any of claims 17-25 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 30-fold binding specificity for GALR2 over GALR1.

27. A method according to any of claims 17-26 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 50-fold binding specificity for GALR2 over GALR1.

28. A method according to any of claims 17-27 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 100-fold binding specificity for GALR2 over GALR1.

29. A method according to any of claims 26-28 wherein the GALR2-specific agonist has greater than 3O-fold binding specificity for GALR2 over GALR3.

30. A method according to any of claims 26-29 wherein the GALR2-specific agonist has greater than 5O-fold binding specificity for GALR2 over GALR3.

31. A method according to any of claims 26-30 wherein the GALR2-specific agonist has greater than 1O0-fold binding specificity for GALR2 over GALR3.

32. A method according to any of claims 26-31 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 1μM.

33. A method of selecting a candidate brain injury, damage or repair prevention or treatment compound, comprising determining whether at least one test compound is a GALR2-specific agonist and selecting the at least one test compound as a candidate compound if it is a GALR2-specific agonist.

34. A method according to claim 33 wherein it is determined that the at least one test compound binds to GALR2 with a binding affinity of between 0 and 100μM and with a specificity of greater than 30-fold for GALR2 over GALR1.

35. A method according to claim 33 or 34 wherein it is determined that at least one test compound binds to GALR2 with a binding affinity between 0 and 100μM and with a specificity of greater that 50 fold for GALR2 over GALR1.

36. A method according to claim 33, 34 or 35 wherein it is determined that at least one test compound binds to GALR2 with a binding affinity between 0 and 100μM and with a specificity of greater that 100 fold for GALR2 over GALR1.

37. A method according to any of claims 34-36 wherein it is determined that at least one test compound binds to GALR2 with a specificity of greater than 30 fold for GALR2 over GALR3.

38. A method according to any of claims 34-37 wherein it is determined that at least one test compound binds to GALR2 with a specificity of greater than 50 fold for GALR2 over GALR3.

39. A method according to any of claims 34-38 wherein it is determined that at least one test compound binds to GALR2 with a specificity of greater than 100 fold for GALR2 over GALR3.

40. A method according to any of claims 34-39 wherein it is determined that the at least one test compound binds to GALR2 with a binding affinity of between 0 and 1μM.

41. A method according to any of claims 33-40 wherein the GALR2 comprises at least a portion of human GALR2.

42. A method according to claim 41 wherein the GALR2 is full-length human GALR2.

43. A method according to any of claims 33-40 wherein the GALR2 comprises at least a portion of non-human GALR2.

44. A method according to claim 43 wherein the GALR2 is rat or mouse GALR2.

45. A method according to claim 43 or 44 wherein the GALR2 is full-length GALR2.

46. A method according to any of claims 33-40 wherein the GALR2 is a chimeric receptor construct.

47. A method according to any of claims 33-46 wherein a selection of test compounds are screened in a high throughput screening assay.

48. A pharmaceutical composition for use in the prevention or treatment of brain injury, damage or disease, the composition comprising:

a) an effective amount of at least one GALR2-specific agonist, or pharmaceutically acceptable salts thereof; and

b) a pharmaceutically suitable adjuvant, carrier or vehicle.

49. A pharmaceutical composition according to claim 48 wherein the brain injury or damage is caused by one of: embolic, thrombotic or haemorrhagic stroke; direct or indirect trauma or surgery to the brain or spinal cord; ischaemic or embolic damage to the brain during cardiopulmonary bypass surgery or renal dialysis; reperfusion brain damage following myocardial infarction; brain disease; immunological damage, chemical damage or radiation damage.

50. A pharmaceutical composition according to claim 49 wherein the immunological damage is the result of bacterial or viral infection.

51. A pharmaceutical composition according to claim 49 wherein the chemical damage is the result of excess alcohol consumption or administration of chemotherapy agents for cancer treatment.

52. A pharmaceutical composition according to claim 49 wherein the radiation damage is the result of radiotherapy.

53. A pharmaceutical composition according to claim 48 or 49 wherein the brain disease is one of Alzheimer's Disease, Parkinson's Disease, Multiple Sclerosis or variant Creutzfeld Jacob Disease.

54. A pharmaceutical composition according to any of claims 48–53 wherein the GALR2-specific agonist is a polypeptide comprising a portion of the galanin amino acid sequence.

55. A pharmaceutical composition according to claim 54 wherein the GALR2-specific agonist is AR-M1896.

56. A pharmaceutical composition according to any of claims 48–53 wherein the GALR2-specific agonist is a non-peptide small chemical entity.

57. A pharmaceutical composition according to any of claims 48–56 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 30 fold binding specificity for GALR2 over GALR1.

58. A pharmaceutical composition according to any of claims 48–57 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 50 fold binding specificity for GALR2 over GALR1.

59. A pharmaceutical composition according to any of claims 48–58 wherein the GALR2-specific agonist has a binding affinity for GALR2 of between 0 and 100μM and greater than 100 fold binding specificity for GALR2 over GALR1.

60. A pharmaceutical composition according to any of claims 57–59 wherein the GALR2-specific agonist has greater that 30-fold binding specificity for GALR2 over GALR3.

61. A pharmaceutical composition according to any of claims 57–60 wherein the GALR2-specific agonist has greater that 50-fold binding specificity for GALR2 over GALR3.

62. A pharmaceutical composition according to any of claims 57–61 wherein the GALR2-specific agonist has greater that 100-fold binding specificity for GALR2 over GALR3.

63. A pharmaceutical composition according to any of claims 57–62 wherein the specific-GALR2 agonist has a binding affinity for GALR2 of between 0 and 1μM.

64. A pharmaceutical composition according to any of claims 48-63 wherein the pharmaceutically suitable adjuvant, carrier or vehicle is selected from: ion exchangers, alumina, aluminium stearate, lecithin, serum proteins, such as human serum albumin, buffer substances such as phosphates, glycine, sorbic acid, potassium sorbate, partial glyceride mixtures of saturated vegetable fatty acids, water, salts or electrolytes, such as protamine sulfate, disodium hydrogen phosphate, potassium hydrogen phosphate, sodium chloride, zinc salts, colloidal silica, magnesium trisilicate, polyvinyl pyrrolidone, cellulose-based substances, polyethylene glycol, sodium carboxymethylcellulose, polyacrylates, waxes, polyethylene-polyoxypropylene-block polymers, polyethylene glycol and wool fat.

65. A pharmaceutical composition according to any of claims 48–64 which is administered orally or parenterally.

66. A pharmaceutical composition according to claim 65 which is administered orally.

67. A pharmaceutical composition according to claim 66 which is in the form of a capsule or a tablet.

68. A pharmaceutical composition according to claim 67 which comprises lactose and/or corn starch.

69. A pharmaceutical composition according to claim 68, further comprising a lubricating agent.

70. A pharmaceutical composition according to claim 69 wherein the lubricating agent is magnesium stearate.

71. A pharmaceutical composition according to claim 66 which is in the form of an aqueous suspension or aqueous solution.

72. A pharmaceutical composition according to claim 71 which comprises an emulsifying agent and/or a suspending agent.

73. A pharmaceutical composition according to any of claims 66-72 which comprises sweetening, flavouring and/or colouring agents.

74. A pharmaceutical composition according to claim 65 which is administered by injection, by needle-free device, by inhalation spray, topically, rectally, nasally, buccally, vaginally or via an implanted reservoir.

75. A pharmaceutical composition according to claim 74 which is administered by injection.

76. A pharmaceutical composition according to claim 75 which is in the form of a sterile injectable preparation.

77. A pharmaceutical composition according to claim 76 wherein the sterile injectible preparation is an aqueous or an oleaginous suspension, or a suspension in a non-toxic parenterally-acceptable diluent or solvent.

78. A pharmaceutical composition according to claim 74 which is administered by needle-free device.

79. A pharmaceutical composition according to claim 78 which is a form suitable for administration by needle-free device.

80. A pharmaceutical composition according to claim 79 wherein the form suitable for administration by needle-free device is an aqueous or an oleaginous suspension, or a suspension in a non-toxic parenterally-acceptable diluent or solvent.

81. A pharmaceutical composition according to any of claims 77 to 80 wherein the aqueous suspension is prepared in mannitol, water, Ringer's solution or isotonic sodium chloride solution.

82. A pharmaceutical composition according to any of claims 77 to 80 wherein the oleaginous suspension is prepared in a synthetic monoglyceride, a synthetic diglyceride, a fatty acid or a natural pharmaceutically-acceptable oil.

83. A pharmaceutical composition according to claim 82 wherein the fatty acid is an oleic acid or an oleic acid glyceride derivative.

84. A pharmaceutical composition according to 82 wherein the natural pharmaceutically-acceptable oil is an olive oil, a castor oil, or a polyoxyethylated olive oil or castor oil.

85. A pharmaceutical composition according to claim 82, 83 or 84 wherein the oleaginous suspension contains a long-chain alcohol diluent or dispersant.

86. A pharmaceutical composition according to claim 85 wherein the long-chain alcohol diluent or dispersant is Ph. Helv.

87. A pharmaceutical composition according to claim 74 which is administered rectally.

88. A pharmaceutical composition according to claim 87 which is in the form of a suppository for rectal administration.

89. A pharmaceutical composition according to claim 88 wherein the suppository comprises a non-irritating excipient which is solid at room temperature and liquid at rectal temperature.

90. A pharmaceutical composition according to claim 89 wherein the non-irritating excipient is one of cocoa butter, beeswax or a polyethylene glycol.

91. A pharmaceutical composition according to claim 74 which is administered topically.

92. A pharmaceutical composition according to claim 91 which is an ointment comprising a carrier selected from mineral oil, liquid petroleum, white petroleum, propylene glycol, polyoxyethylene-polyoxypropylene compounds, emulsifying wax and water.

93. A pharmaceutical composition according to claim 91 which is a lotion or cream comprising a carrier selected from mineral oil, sorbitan monostearate, polysorbate 60, cetyl esters wax, cetearyl alcohol, 2-octyldodecanol, benzyl alcohol and water.

94. A pharmaceutical composition according to claim 74 which is administered nasally.

95. A pharmaceutical composition according to claim 94 which is administered by nasal aerosol and/or inhalation.

96. A method of inhibiting the death of a cell comprising contacting the cell with an amount of a GALR2-specific agonist effective to inhibit the death of the cell.

97. A method according to claim 96 wherein the cell is a neuron.

98. A method according to claim 96 or 97 wherein the cell is a neuron from the central nervous system.

99. A method according to claim 96, 97 or 98 wherein the cell is a hippocampal or cortical neuron.

100. A method according to any of claims 96 to 99 wherein the cell is a human cell.